

REMARKS

In the last Office Action, claims 13-14 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite due to the terms "directive diffusion layer" and "specific angular range". Claims 13-14 were further rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 9, 12, 15 and 17-23 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0089622 to Kuroiwa et al. ("Kuroiwa"). Claims 10 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kuroiwa in view of U.S. Patent No. 6,809,782 to Kawamoto et al. ("Kawamoto"), and claims 11 and 24-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kuroiwa in view of Kawamoto and further in view of U.S. Patent No. 6,542,208 to Akiyama.

In accordance with this response, claims 9-23 have been amended, claims 24-28 have been canceled and new claims 29-30 have been added. Claim 29 is an independent claim, and claim 9 (which was previously an independent claim) has been amended to depend on base claim 29. The specification has been revised in editorial respects and to change the term "directive diffusion layer" to --directional diffusion layer--.

As described in the specification on page 16, the directional diffusion layer functions to scatter light that enters at an angle within a specific angle range and directs the scattered light in a specific direction. In the disclosed embodiment, the directional diffusion layer 25 scatters light entering within a specific angular range of 5 to 15 degrees whereas light entering at an angle outside this range is mostly transmitted. Thus as shown in Fig. 8, the observer 12 has a larger viewing angle than in the case without a directional diffusion layer, such as the observer 12 in Fig. 1B. As presently worded, claims 13-14 are fully supported by the disclosure and particularly point out and distinctly claim the subject matter of the invention. Accordingly, the rejection of claims 13-14 under 35 U.S.C. §112, second paragraph, should be withdrawn.

Applicants respectfully traverse the non-enablement rejection of claims 13-14 under 35 U.S.C. §112, first paragraph and request reconsideration and withdrawal thereof. The manufacture of directional diffusion layers having prescribed light-diffusing properties is well known in the art as shown, for example, in attached U.S. Patent Nos. 6,505,959 and 6,700,634. As the present disclosure is directed to one skilled in the art, no more description is needed than that provided in the specification to enable one skilled in the art

to produce a directional diffusion layer having the characteristics described in the specification.

The present invention pertains to a liquid crystal display device for displaying information viewable by an observer from opposite sides of the device using incident light incident from only one of the sides of the device. While liquid crystal display devices offering two-sided viewing are known in the art, none uses incident light incident from only one direction. Instead, the conventional liquid crystal display devices that enable an observer to view the display from both the front and back sides generally require a separate light source, either a front light or a back light, or both. None uses only incident light incident from one side of the liquid crystal display device, as in the case of the present invention.

Newly added independent claim 29 recites a liquid crystal display device for displaying information viewable by an observer from opposite sides of the device using incident light incident from only one of the sides. As shown, for example, in the embodiment of Fig. 1, the inventive liquid crystal display device has a liquid crystal panel 1 having two opposing substrates which sandwich therebetween a liquid crystal layer. The liquid crystal panel is driven in a manner well known in the art to change the direction of polarization

of the polarized light passing therethrough at selected regions of the liquid crystal layer to produce display information. A polarizer 2 is disposed over a first side of the liquid crystal panel 1 for polarizing incident light 13 that is incident on the panel. A reflection-polarizing plate 3 is disposed over a second side of the liquid crystal panel 1 opposite the first side for receiving polarized incident light exiting the panel 1.

The incident light 13 that is polarized by the polarizer 2 and transmitted through the liquid crystal panel 1 undergoes a change in direction of polarization at selected regions thereof and is reflected by the reflection-polarizing plate 3 back through both the liquid crystal panel 1 and the polarizer 2 to enable an observer 11 to view the display information from the first side of the liquid crystal panel (Fig. 1A). On the other hand, incident light 13 that is polarized by the polarizer 2 and transmitted through the liquid crystal panel 1 without undergoing a change in direction of polarization at selected regions thereof is transmitted through the reflection-polarizing plate 3 to enable an observer 12 to view the display information from the second side of the panel 1 (Fig. 1B).

No similar liquid crystal display device is disclosed or suggested in the prior art. The primary

reference to Kuroiwa discloses a liquid crystal display device of the type that displays information on only one side. More particularly, the Kuroiwa liquid crystal display device has an absorption polarizer 120 disposed on a first side of a liquid crystal panel 130, and another absorption polarizer 140, a diffusing plate 150, a reflection polarizer 160 and a backlight 170 disposed on a second side of the liquid crystal panel 130. The backlight 170 includes a light source 171 and a light guide plate 172 having a reflector for directing light from the light source 171 forwardly through the pixels of the liquid crystal panel 130. See paragraph [0043]. The presence of the backlight 170 and the reflector at the back of the light guide plate 172 preclude an observer from viewing the display from the back side. Thus Kuroiwa does not disclose a liquid crystal display device that displays information viewable by an observer from opposite sides of the device using incident light incident from only one of the sides, as required by independent claim 29.

Akiyama discloses a liquid crystal display device which can display information on both sides; however, the reference device requires two reflection polarizers (reflection-polarizing plates) which receive incident light from two opposite directions whereas the present invention uses only one reflection-polarizing plate which receives

incident light from only one direction. More particularly, the Akiyama liquid crystal display device has, as shown in Fig. 1, a liquid crystal panel 7 sandwiched between reflection-type polarizing films 8 and 9 which, in turn, are sandwiched between absorption-type polarizing films 10 and 11. Thus the reflection-type polarizing film 8 and the absorption-type polarizing film 10 are disposed on a first side of the liquid crystal panel 7, and the reflection-type polarizing film 9 and the absorption-type polarizing 11 are disposed on a second side of the liquid crystal panel 7. In the reference device, incident light that is incident from one direction onto the surface A is polarized and reflected by the reflection-type polarizing film 9 so that an observer may view the display from a first side (surface A side) of the device. See column 4, line 49 - column 5, line 30. On the other hand, incident light that is incident from another direction onto the surface B is polarized and reflected by the reflection-type polarizing film 8 so that an observer may view the display from the second side (surface B side) of the device. See column 5, lines 31-62. By contrast, claim 29 requires that the liquid crystal display device displays information viewable by an observer from opposite sides of the device using incident light incident from only one of the sides, and such is achievable because the invention uses only one reflection-

polarizing plate disposed on the second side of the liquid crystal panel. Thus Akiyama does not disclose or suggest the presently claimed invention.

Kawamoto discloses a liquid crystal display device having a diffusing/polarizing member 1 consisting of a diffusing layer 11, a reflecting polarizer 12 and an absorbing layer 13. The absorbing layer 13 absorbs light through the reflecting polarizer 12, and thus an observer can not view the display from the second side of the liquid crystal panel. Kawamoto like Kuroiwa, discloses a liquid crystal display device that can be viewed from only one side.

As the combined teachings of the prior art provide no reason, suggestion or motivation to modify the reference disclosures to arrive at the presently claimed invention, there is no evidentiary basis to support an obviousness rejection based on the art of record. See, for example, Symbol Technologies, Inc. v. Opticon, Inc., 935 F.2d 982,989, 18 USPQ2d 1885 (Fed. Cir. 1991).

In view of the foregoing, the application is now believed to be in allowable form. Accordingly, favorable reconsideration and passage of the application to issue are respectfully requested.

Respectfully submitted,

ADAMS & WILKS
Attorneys for Applicants

By: 

Bruce L. Adams
Reg. No. 25,386

50 Broadway - 31st Floor
New York, NY 10004
(212) 809-3700

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Debra Buonincontri

Name



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